

WHAT IS CLAIMED IS:

1. A method of packaging ball grid arrays, comprising:
providing a substrate having a plurality of holes formed therein, each
hole associated with a respective one of a plurality of contact pads formed on a
first surface of the substrate;
disposing a plurality of balls within respective ones of the plurality of
holes such that at least a portion of each ball projects outwardly from the first
surface; and
applying a force to each of the balls outwardly from the first surface to
couple the balls to the substrate.
2. The method of Claim 1, wherein providing the substrate further
comprises providing a tape substrate having a thickness of approximately 50 microns.
3. The method of Claim 1, wherein providing the substrate further
comprises providing a laminate substrate.
4. The method of Claim 1, wherein the portion of each ball projects
outwardly from the first surface by a distance of approximately 25 to 50 microns.
5. The method of Claim 1, wherein applying the force to each of the balls
comprises applying a force to each of the balls from above the first surface with a
punch tool to couple the balls to the substrate.
6. The method of Claim 5, further comprising heating the punch tool
before applying the force.
7. The method of Claim 1, wherein applying the force to each of the balls
comprises simultaneously applying the force to each of the balls.

8. The method of Claim 1, wherein applying the force to each of the balls further comprises applying enough force to deform the tops of each ball such that a portion of each ball overlaps the substrate proximate an edge of its respective hole.

9. A system of packaging ball grid arrays, comprising:

a substrate having a plurality of holes formed therein, each hole associated with a respective one of a plurality of contact pads formed on a first surface of the substrate;

5 a plurality of balls disposed within respective ones of the plurality of holes, at least a portion of each ball projecting outwardly from the first surface; and

a punch tool operable to apply a force to each of the balls outwardly from the first surface to couple the balls to the substrate.

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10. The system of Claim 9, wherein the substrate comprises a tape substrate having a thickness of approximately 50 microns.

11. The system of Claim 9, wherein the portion of each ball projects
15 outwardly from the first surface by a distance of approximately 25 to 50 microns.

12. The system of Claim 9, further comprising a heating source operable to heat the punch tool.

13. The system of Claim 9, wherein the punch tool is operable to
20 simultaneously apply the force to each of the balls.

14. The system of Claim 9, wherein the punch tool is operable to apply
25 enough force to deform the tops of each ball such that a portion of each ball overlaps the substrate proximate an edge of its respective hole.

15. A method of packaging ball grid arrays, comprising:

providing a substrate having a plurality of holes formed therein, each hole formed within a respective one of a plurality of contact pads formed on a first surface of the substrate;

5 disposing, from below a second surface of the substrate, a plurality of balls within respective ones of the plurality of holes;

causing at least a portion of each ball to project outwardly from the first surface;

10 disposing a punch tool adjacent the first surface of the substrate, the punch tool having a plurality of punches arranged in a pattern that substantially matches a pattern of the balls;

heating the punch tool; and

applying a force to each of the balls with respective punches to couple the balls to the substrate.

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16. The method of Claim 15, wherein providing the substrate further comprises providing a tape substrate having a thickness of approximately 50 microns.

20 17. The method of Claim 15, wherein providing the substrate further comprises providing a laminate substrate.

18. The method of Claim 15, wherein the portion of each ball projecting outwardly from the first surface by a distance of approximately 25 to 50 microns.

25 19. The method of Claim 15, wherein applying the force to each of the balls comprises simultaneously applying the force to each of the balls.

30 20. The method of Claim 15, wherein applying the force to each of the balls further comprises applying enough force to deform the tops of each ball such that a portion of each ball overlaps the substrate proximate an edge of its respective hole.